

## TOPIC 2.

(Computer System with A.I.A.)

### FUNDAMENTALS OF COMPUTER OPERATIONS

- Computer operations refers to the basic activities a Computer performs to receive data, process it, store it, and produce output.

- The operations are Coordinated by the Central Processing Unit (CPU) and Controlled by the operating system (os).

#### a) Input.

This is the process of entering data or instructions into a Computer.

Devices used for input include

Keyboard

Mouse.

Scanner

Microphone

Camera

Touchscreen.

- Input converts human-readable data into Machine-readable form.

#### b) Processing.

Processing is the operation where the Computer Manipulates, Calculates, or transforms data into Meaningful information.

- Processing is performed by the CPU, Made up of:

- ALU (Arithmetic and Logic Unit): performs Calculations and Logical Comparisons.
- CU (Control Unit): Directs and Coordinates operations inside the Computer.
- Registers: High-Speed temporary Storage inside CPU.

Examples of processing:

- Calculating totals.
- Sorting data.
- Comparing values.
- Running Applications.

### c) Output.

Output involves presenting processed information to the user in a readable form.

Output devices include:

- Monitor / screen.
- Printer
- Speakers
- Projectors.

Outputs may be text, images, sound or video.

### d) Storage.

Storage refers to Saving data and information for future use.

There are two Main types:

1. Primary Storage (Main Memory).
  - RAM (Random Access Memory): Temporary; data lost when power is off.
  - ROM (Read Only Memory): Permanent;

Contains essential startup instructions.

## 2. Secondary Storage

- Hard disk drive (HDD)
- Solid State drive (SSD)
- USB flash drive.
- Memory Card.
- Cloud Storage.

- storage ensures data remains available even after power is turned off.

## 3. Control Unit

- Control Operations Manage and Coordinate all other computer activities. This is handled by

## Introduction to operating System (OS)

- An operating system (OS) is a system software that manages computer hardware, runs applications, and provides a user interface.
- It acts as an intermediary between the user and the hardware.

Examples : Windows, Linux, Mac OS, Android, iOS.

## Functions of an operating system

### 1. Process Management

- Controls the execution of programs.

### 2. Memory Management

- Keeps track of memory usage.

### 3. File Management

- Controls access to files.

### 4. Device Management

- Manages input / output operations.

## 5. Managing Security and protection.

- Protects data from unauthorized access.

## 6. User interface Management.

- Offers a way for users to interact with the system.

## Types of Operating Systems.

### 1. Single-user, Single-Task.

- Allows one user and one task at a time.

- Example: Older Mobile OS versions.

### 2. Single-user, Multi-Tasking.

- One user can run multiple tasks.

- Examples: Windows, MacOS.

### 3. Multi-user OS.

- Many users can run multiple tasks.

### 3. Multi-user OS.

Many users can use the system at the same time.

- Example: Linux, Lin4x.

### 4. Real-Time Operating System (RTOS).

- Designed for systems requiring immediate response.

- Used in medical devices, robots, aircraft systems.

### 5. Distributed Operating System.

- Controls a group of separate computers as one system.

- Used in clusters and grids.

## 6. Embedded Operating System.

- Built into devices such as TVs, Microwaves and ATMs.
- Examples: Android Wear, iOS embedded versions.

## Components of an Operating System.

### 1. Kernel.

- The core part of the OS.
- Manages CPU, memory, and devices.
- Runs at the lowest level.

### 2. Shell.

- Interface between user and OS.
- Can be GUI (Windows, MacOS) or CLI (Linux terminal).

### 3. File System.

- Organizes data and manages how files are stored and retrieved.

### 4. Device Drivers.

Programs that allow the OS to communicate with hardware.

## BOOTING PROCESS.

Booting is the process of starting up the computer.

### Types of booting.

1. Cold Booting : Starting the Computer when it is Completely Off.

2. Warm Booting : Restarting a Computer that



Shot on AWESOME A70

is already on its way to booting.

### Steps in booting:

- i) Power is turned on.
- ii) BIOS / UEFI runs POST (Power-on self test).
- iii) OS is loaded into RAM.
- iv) User interface appears.

### Computer Operations Cycle

The CPU performs operations in a continuous cycle called the Fetch-Decode-Execute cycle:

1. Fetch: Retrieve instruction from Memory.
  2. Decode: Interpret the instruction. (Calculation move data, etc) →
  - This 3. Execute: perform the instruction. (Calculation move data, etc).
- This cycle happens millions or billions of times per second.